Before the

FEDERAL COMMUNICATIONS COMMISSION Washington, D.C. 20554

In the Matter of)	RECEIVED
Amendment of Parts 2 and 97 of the) RM-9404	JAN - 7 1999
Commission's Rules to Create a)	OAN - 7 1999
Low Frequency Allocation for the)	PEDEFOL GOVERNMENTICUM COMMISSION OFFICE OF THE ESCRIPTING
Amateur Radio Service)	

To: The Commission

REPLY COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

The American Radio Relay League, Incorporated (the League), by counsel and pursuant to Section 1.405(b) of the Commission's Rules [47 C.F.R. §1.405(b)], hereby respectfully submits its reply to the comments filed December 23, 1998 by Texas Instruments, Incorporated (TI) in this proceeding. TI's comments were filed in response to the League's Petition for Rule Making (Petition), captioned as above, filed by the League on or about October 22, 1998. In response to TI's concerns, the League states as follows:

1. TI manufactures, among other things, radio frequency identification (RFID) products, including electronic ignition and door locks, animal identification systems, parking and building access controls, and vehicular refueling identification systems such as the Mobil SpeedPass system. These type devices operate apparently in the 121-134.2 kHz portion of the low-

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¹ There were no other comments served on the League in this proceeding, and the Commission's ECFS proceedings history listing shows none as of the date of these reply comments. These reply comments are timely filed.

frequency spectrum. Though TI notes that it doesn't expect interference from "most amateur LF operations" should the Commission proceed with the allocation requested by the League at 135.7-137.8 kHz,² it is nonetheless concerned about interference to and from amateur operations at 135.7-137.8 kHz, stating that there will be no database information available to determine where, geographically, amateur LF operation is being conducted. TI indicates that some interference to licensed amateur operation might occur as the result of the loop antennas used by some RFID tag reading facilities, which operate on an RF induction basis.

2. The League appreciates both the concerns of TI, and the accommodating tenor of TI's comments. It is understood that TI "regards engineering talent as one of its key resources" and that it is "reluctant to oppose increased experimentation by radio amateurs". Indeed, TI makes no suggestion that the proposed Amateur allocation at 135.7-137.8 kHz not proceed. Rather, it asks for three conditions to be placed on amateur operation in the 135.7-137.8 kHz segment, which it believes will accommodate the Part 15 RFID devices operating on adjacent frequencies. First, it asks that amateur antennas be designed to emphasize E-field rather than H-field radiation. Second, it urges that amateur power at those frequencies be limited to 2 watts EIRP (as proposed in the League's petition)³. Third, it asks that interference to amateur stations

² TI raises no concern with the proposed 160-190 kHz allocation, and proposes no restriction on amateur operation in that segment.

³ TI apparently does not support a transmitter power output limitation of 200 watts, but its stated concern is that some amateurs may not be able to calculate EIRP as accurately as necessary. The League's proposal is to permit up to 200 watts PEP output, but in no case greater than 2 watts EIRP. Since the EIRP limitation is satisfactory to TI, there appears no disagreement. Any concern about the calculation of EIRP can be addressed in amateur examinations for those license classes eligible to use this band. In any case, it is difficult to envision an amateur station configuration at that transmitter power level that would even approach the two-watt EIRP limit. On a rare occasion, an amateur might make temporary use

operating at 135.7-137.8 kHz should be defined so as to exclude emissions from Part 15 devices operating at the current general conducted and radiated emission limits set forth in Sections 15.207 and 15.209 of the Commission's Rules.

3. It is not the intention of the League to introduce an incompatible use in the 135.7-137.8 kHz or 160-190 kHz segments. Nor does the League expect that amateur operation in either of those segments will have any interaction at all with RFID or other Part 15 devices operating in the 121-134.2 kHz segment,⁴ for several reasons. First of all, there have been high-power government stations in this band for some time.⁵ With typical antenna efficiencies in these segments, and assuming a transmitter power level of 200 watts PEP output, amateur EIRP will normally be far less than the maximum 2-watt EIRP limitation proposed in the League's petition; typical will be 1/2 watt EIRP. Antenna bandwidth at those frequencies is extremely narrow, and adjacent-frequency interference is unlikely to be a factor, whether or not the

of an unused broadcast tower for an experiment, but normal amateur operation with typical antenna efficiency would be well within the two-watt EIRP limit.

⁴ In one respect, TI's comments are unclear: it indicates, first, that its RFID systems operate in the 121-134.2 kHz portion of the LF spectrum (*TI Comments, at 1*). However, its request is that the Commission consider RFID systems "operating at and near" the 135.7-137.8 kHz proposed amateur allocation (*Id. at 1*). It is difficult, therefore, to understand whether TI is concerned with operation of Part 15 devices and amateur stations within, or merely adjacent to, the 135.7-137.8 kHz segment. It is assumed herein from TI's comments that its concern is the latter. In any case, it would seem not unreasonable to suggest that Part 15 RFID manufacturers avoid that very small segment in the design of future products.

⁵ Since the filing of the League's petition, it has been reported that there are several FSK systems operating in this band at the 20-50 kW level. If in fact these stations are operating, they apparently have caused no interference to RFID systems, unless special frequency configurations have been utilized on a geographic basis by RFID systems to accommodate the fixed stations. Such fixed stations might geographically limit amateur operation in the lower proposed segment, but their presence would indicate that RFID systems require little protection from an amateur allocation at 135.7-137.8 kHz.

amateur antennas favor E-field or H-field radiation.

- 4. The League is reluctant to specify antenna type in the rules. It is important not to stifle amateur experimentation with antenna systems, one of the fundamental areas of inquiry and experimentation in the Amateur Service. This is especially important in an LF allocation, since antenna efficiency is inevitably very low, and bandwidths narrow. It is expected that amateurs would typically utilize long wire fences, other long wires, vertical antenna systems, and other antennas that emphasize E-field radiation. However, specification of antenna type by rule is largely antithetical to the goal of the LF allocation for the Amateur Service in the first place. It is not clear from the TI comments what the distance separation would have to be between RFID systems and adjacent-frequency amateur stations at the proposed power levels using, for example, loop-type antennas. Indeed, there is little offered by way of technical information about RFID systems at all. Because antenna limitations have not been shown to be necessary in order to avoid interaction between amateur LF stations and Part 15 RFID systems on adjacent frequencies, the League believes that no such limitations should be imposed.
- 5. As a general matter, the Commission should not make allocation decisions based in whole or in part on the presence or absence of Part 15 devices in a particular band segment. Those devices are, or should be, transparent in the allocation process, as they have no allocation status themselves. Nor is it apparent that any restriction would be necessary on amateur operation in order to protect incumbent Part 15 devices on adjacent frequencies from interference, other than those suggested in the League's Petition. However, as newcomers to the band, and given the uniqueness of the proposed LF allocation and the utility to the public of incumbent RFID systems, the League acknowledges TI's concerns and will make all reasonable

accommodation for incumbent Part 15 devices operating in bands adjacent to the 135.7-137.8 kHz segment, in accordance with Sections 15.207 (conducted emission limits) and 15.209 (general radiated limits). The League believes it unnecessary to exempt such operation from the interference resolution obligations applicable to all Part 15 devices, however. The League does not expect significant interference to amateurs from RFID systems operating under Part 15 near the 135.7-137.8 kHz segment in any case. It is anticipated that much amateur operation will be at 160-190 kHz in any case, though the lower-frequency segment sought in the League's petition corresponds to the European amateur LF allocation and is desirable for that reason. If significant interference to amateurs from RFID systems results, the League will address that issue with TI on an informal basis. Two points give the League comfort here: (1) A fair reading of TI's comments would lead to the conclusion that RFID Part 15 devices are not now being deployed in the 135.7-137.8 kHz segment; as such, there is no reason why any allocation condition should be placed on amateur use of that small segment; and (2) TI offers no technical analysis that would allow a determination of the extent of interference that amateurs operating at 135.7-137.8 kHz might expect from RFID Part 15 systems operating at, for example, 121-134.2 kHz.

6. The League is willing to work cooperatively with TI in addressing any interference

⁶ As no part of TI's concern relates to the 160-190 kHz segment, which is far removed from the frequencies used by RFID systems, there is no need for any restriction on that allocation beyond those suggested by the League in its Petition, and the League would request that none be imposed.

⁷ Section 15.209 of the Commission's Rules permits fundamental radiated emissions in the 9-490 kHz band at field strengths up to 2.4 mV/m measured at 300 meters using an average detector.

concerns that arise. If it can be shown, after analysis of the technical specifications of RFID systems operating in the LF segments near the proposed amateur 135.7-137.8 kHz band, that there is a need to protect incumbent and planned RFID products, it is the League's intention to make necessary accommodations in that segment. However, the need for, and the extent of, those accommodations is not presently clear. That issue is best addressed in comments on a Notice of Proposed Rule making relative to both LF segments sought by the League's Petition.

7. As only TI submitted comments on the League's Petition, and as those comments addressed only the 135.7-137.8 kHz segment and not the 160-190 kHz segment, the League requests that the Commission proceed with the proposed allocations forthwith. The League's technical staff will be pleased to work with TI in the meantime to address the interference concerns to RFID systems in the lower segment, and it is anticipated that an accommodation can be reached which will be satisfactory to both TI and the Amateur Service.

Therefore, the foregoing considered, the American Radio Relay League, Incorporated again respectfully requests that the Commission proceed without delay to issue a Notice of Proposed Rule Making proposing a domestic allocation for the Amateur Service, secondary to

the Fixed and Maritime Mobile services in the 135.7 to 137.8 kHz band, and secondary to the Fixed Service in the 160-190 kHz band, with limitations in the Part 97 rules as set forth in the Appendix to its Petition.

Respectfully submitted,

THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

Christopher D. Imlay

Its General Counsel

BOOTH FRERET IMLAY & TEPPER, P.C. 5101 Wisconsin Avenue, NW Suite 307 Washington, DC 20016-4120 (202) 686-9600

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